# UNITED STATES PATENT AND TRADEMARK OFFICE

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/659,912 | 09/10/2003 | Stephen T. Sparks | 10030998-1 | 6008 |

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| EXAMINER |
|---|
| CHOW, CHARLES CHIANG |

| ART UNIT | PAPER NUMBER |
|---|---|
| 2618 | |

DATE MAILED: 04/06/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

| | **Application No.** | **Applicant(s)** |
|---|---|---|
| | 10/659,912 | SPARKS, STEPHEN T. |
| **Office Action Summary** | **Examiner** | **Art Unit** | -- |
| | Charles Chow | 2618 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on <u>10 September 2003</u>.

2a)☐ This action is **FINAL**.     2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) <u>1-20</u> is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) <u>1-20</u> is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on <u>06 February 2004</u> is/are: a)☒ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All  b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date <u>2/14/05</u>.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

## Detailed Action

### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

1.  Claims 1-5, 9, 11, 14-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over

Schenk (US 5,307,029) in view of Ashe et al. (US 5,809,087).

**Regarding claim** 1, Schenk teaches a heterodyne system [Fig. 2] comprising

a first signal path [path for 13a & 14] receiving a drive signal [drive signal to splitter 12

from PLO11, applicant's drive signal xd ] and providing a first signal in response to the drive

signal [ the first signal input to mixer 15, via 13a & BPF 14, in response to drive signal from

11 to input of 12],

a second signal path receiving the drive signal [ the direct connection from 12 to mixer

15, receiving drive signal input to 12] and providing a second signal in response to the drive

signal [ the second signal input to mixer 15 via 12 in response to drive signal from 11 to

input of 12],

a mixer [15] receiving the first signal and the second signal, providing a series of mixing

products of the first signal and the second signal [ the generating of series of clean

frequencies  by mixing filtered harmonics with the reference signal in abstract],

Schenk fails to teach the integer ratio [(g*B)/(g*A) in applicant's paragraph 0011] which

is taught by Ashe et al. (Ashe) in below.

Ashe teaches the at least one of the first signal path [path having N1, multiplier 12, Fig.

1] and the second signal path [ path having No, multiplier 13]

scaling the frequency of the drive signal [ multiplying drive signal from 11 by N1 & No] so that the frequency of the first signal divided by the frequency of the second signal is an integer ratio [ the integer ratio N1/No, Fig. 2, col. 2, lines 45-67];

Ashe's teaches the multipliers 12, 13 for providing more higher frequencies for selection, to replace Schenk's two signal paths to mixer 15, for generating reference signal S1. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to upgrade Schenk with Ashe's multipliers in each signal path, in order to providing more higher frequency selections from the multiplier.

**Regarding claim 2,** Schenk combined with Ashe, for Ashe's teaching of the wherein the series of mixing products includes a designated signal [ the designated signal S1 from BPF 17 in series of mixing products from mixer 15, Fig. 1], and

wherein mixing products in the series other than the designated signal are offset in frequency from the designated signal by integer multiples of the frequency of the second signal divided by the denominator of the integer ratio when the integer ratio is reduced to lowest terms [ Ashe teaches the mixing of the frequencies, N1fo & Nofo, which is equivalent toe applicant's circuitry in Fig. 2A, applicant's integer ratio B/A, paragraph 0011, for Ashe's integer ratio N1/No, having denominator of No, for the offset (1/No)*(Nofo), L is integer 1 when integer ratio reduced to lowest terms, applicant's offset (L/A)*f2, & L=1 in paragraph 0014-0016].

**Regarding claim 3,** Schenk teaches the further comprising at least one filter [ BPF 17, Fig. 2] selecting a designated one of the mixing products in the series [selecting designated 1400 MHz in the mixing product series].

**Regarding claim 4.** Schenk teaches the further comprising at least one filter selecting the designated signal [ 17 for 1400 MHz] and rejecting mixing products in the series other

than the designated signal [ the band pass which filters away other mixing products in the series other than designated signal, which is well known in the art].

**Regarding claim 5,** Schenk combined with Ashe, for Ashe's teaching of the wherein the first signal path includes a frequency multiplier [12].

**Regarding claim 9,** Schenk teaches the further comprising a source providing the drive signal to the first signal path and the second signal path [ the splitter 12 receives drive signal from 11 for providing signal to first path to 13a and second path directly to mixer 15, Fig. 2].

**Regarding claim 11,** Schenk teaches a heterodyne system [Fig. 2] comprising

a second signal path receiving the drive signal [ the direct connection from 12 to mixer 15, receiving drive signal input to 12] and providing a second signal in response to the drive signal [ the second signal input to mixer 15 via 12 in response to drive signal from 11 to input of 12], and

a mixer [15] receiving the first signal and the second signal, and providing a series of mixing products of the first signal and the second signal [ mixing filtered harmonic with the reference & outputting series of clean frequencies, abstract],

Schenk fails to teach a first signal path scaling the frequency of a received drive signal by an integer multiple to provide a first signal.

Ashe teaches a first signal path scaling the frequency of a received drive signal by an integer multiple to provide a first signal [ the first path receive drive signal from 11 haiving multiplier 12 to scale the fo by integer multiple N1, to N1fo, to provide a first signal, Fig. 1, col. 2, lines 45-53].

Ashe's teaches the multipliers 12, 13 for providing more higher frequencies for selection, to replace Schenk's two signal paths to mixer 15, for generating reference signal S1. Therefore, it would have been obvious to one of ordinary skill in the art at the time the

invention was made to upgrade Schenk with Ashe's multipliers in each signal path, in order

to providing more higher frequency selections from the multiplier.

**Regarding claim 14.** Schenk teaches the further comprising at least one filter [ BPF 17,

Fig. 2] selecting a selecting a designated mixing product from the series of mixing products

[selecting designated 1400 MHz in the mixing product series].

**Regarding claim 15,** Schenk combined with Ashe, for Ashe's teaching of the wherein

the at least one filter has a stop band rejecting mixing products in the series [ the BPF 17,

which is a band pass filter having stop band is well known in  the art to reject undesired out

of band signal in the stop band],

the mixing products in series that are offset in frequency from the designated mixing

product by integer multiples of the frequency of the second signal [ Ashe teaches the mixing

of the frequencies, N1fo & Nofo, which is equivalent toe applicant's circuitry in Fig. 2A,

applicant's integer ratio B/A, paragraph 0011, for Ashe's  integer ratio N1/No, having

denominator of No, for the offset (1/No)*(Nofo), L is integer 1 when integer ratio reduced to

lowest terms, applicant's offset (L/A)*f2, & L=1 in paragraph 0014-0016].

**Regarding claim 16.** Schenk teaches the further comprising a source providing the

drive signal to the first signal path and the second signal path [ source PLO 11 providing

drive signal input to splitter 12 to the first path 13a and the second path directly to mixer 15

via 12].

**Regarding claim 17.** Schenk teaches a heterodyne method [col. 3, line 61 to col. 4, line

65, Fig. 2] comprising

receiving a drive signal [ the drive signal from reference 11, col. 4, lines 36-39];

providing a first signal and a second signal in response to the drive signal [ providing

filtered first signal from BPF 14 to mixer 15, to mix with reference frequency at mixer 15, col.

4, lines 39-56], and

mixing the first signal and the second signal to provide a series of mixing products of the

first signal and the second signal [col. 4, line 51-65].

Schenk fails to teach the wherein the frequency of the first signal divided by the

frequency of the second signal is an integer ratio.

Ashe teaches the frequency [N1fo] of the first signal divided by the frequency [Nofo] of

the second signal is an integer ratio [ the ratio N1/No, Fig. 2, col. 2, lines 45-67].

Ashe's teaches the multipliers 12, 13 for providing more higher frequencies for selection,

to replace Schenk's two signal paths to mixer 15, for generating reference signal S1.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the

invention was made to upgrade Schenk with Ashe's multipliers in each signal path, in order

to providing more higher frequency selections from the multiplier.

**Regarding claim 18**. Schenk teaches wherein the series of mixing products includes a

designated signal [1400 MHz, Fig. 2].

Schenk combined with Ashe, for Ashe's teaching of the wherein mixing products in the

series other than the designated signal are offset in frequency from the designated signal by

integer multiples of the frequency of the second signal divided by the denominator of the

integer ratio when the integer ratio is reduced to lowest terms [ Ashe teaches the mixing of

the frequencies, N1fo & Nofo, which is equivalent toe applicant's circuitry in Fig. 2A,

applicant's integer ratio B/A, paragraph 0011, for Ashe's integer ratio N1/No, having

denominator of No, for the offset (1/No)*(Nofo), L is integer 1 when integer ratio reduced to

lowest terms, applicant's offset (L/A)*f2, & L=1 in paragraph 0014-0016].

**Regarding claim 19,** Schenk teaches the further comprising at least one filter [ BPF 17, Fig. 2] selecting a designated one of the mixing products in the series [selecting designated 1400 MHz in the mixing product series].

2. Claims 6-7, 12, 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schenk in view of Ashe, as applied to claims 1, 11 above, and further in view of Fayman (US 3,223,928).

**Regarding claims 6, 20,** Schenk & Ashe fail to teach the wherein the second signal path includes a modulator imposing modulation on the second signal.

Fayman teaches these features [ in the second path, Fig. 1, the modulator, SSB generator 12, modulating second signal, carrier fc, with fm, col. 2, lines 8-23], for providing modulated signal operating in a wide band frequency range [col. 11, lines 11-16] conveniently generating modulated carrier signal in a path for outputting. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to upgrade Schenk & Ashe with Fayman modulator 12, in order to conveniently generating modulated signal for outputting.

**Regarding claims 7, 12,** Schenk & Ashe combined with Fayman, for the Fayman's teachings for the wherein the second signal path includes a modulator, for, imposing modulation on the second signal [in the second path, Fig. 1, the modulator, SSB generator 12, modulating second signal, carrier fc, with fm, col. 2, lines 8-23].

3. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Schenk in view of Ashe, as applied to claim 5 above, and further in view of Wells (US 4,914,405).

**Regarding claim 8,** Schenk & Ashe fail to teach the wherein the frequency multiplier includes cascaded frequency doublers.

Well teaches these features [ the cascaded multipliers 12 in one signal path, Fig. 3, col. 3, line 65 to col. 4, line 31] for conveniently providing more selectable higher frequencies from the cascaded multipliers 12 for low noise performance [col. 3, line 50 to col. 4, line13]. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to upgrade Schenk & Ashe with Wells' low noise cascaded multipliers 12, in order to conveniently providing more selectable higher frequencies from the cascaded multipliers with low noise.

4. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Schenk in view of Ashe, as applied to claim 9 above, and further in view of Peterzell et al. (US 6,960,962 B2).

**Regarding claim 10,** Schenk & Ashe fail to teach the further comprising a switchable bypass path alternatively coupling the designated signal and the drive signal to an output. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to upgrade.

Peterzell et al. (Peterzell) teaches a switchable bypass path [580, Fig. 7] alternatively coupling the designated signal [ signal output from 545 via 520, 530 to output divider 550] and the drive signal to an output [ signal from VCO 501 to output of mixer 540], for providing the sections of multiple operating frequency bands [abstract, col. 13, line 39 to col. 4, line 1] with reduced oscillator leakage [abstract]. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to upgrade Schenk & Ashe with Peterzell' bypass switch 580, for providing multiple operating frequency bands with low oscillator leakage.

5. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Schenk in view of

Ashe, Fayman, as applied to claim 12 above, and further in view of Detering et al. (US 6,850,121 B1).

**Regarding claim 13,** Schenk, Ashe & Fayman fail to teach the wherein the modulator is an IQ modulator.

Detering et al. (Detering) teaches the second signal path including an IQ modulator 39 for imposing modulation on the second signal from 19 [Fig. 9] to provide modulated IQ signal to mixer 32 [col. 6, lines 38-57], to produce low noise IQ modulated signal [col. 2, lines 66-67 & col. 2, line 57 to col. 3, line 3]. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to upgrade Schenk & Ashe with Detering's IQ modulator, in order to provide low noise modulated IQ signal.

*Conclusion*

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

   A. (US 4,745,373), Carp et al. teaches the low frequency synthesizer for generating 2C Hertz, by mixing signal from multiplier M-1 and divider D-1 and a oscillator G-1 [abstract, Fig. 2].

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Charles Chow whose telephone number is (571) 272-7889. The examiner can normally be reached on 8:00am-5:30pm.

   If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward Urban can be reached on (571) 272-7899. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be

obtained from either Private PAIR or Public PAIR. Status information for unpublished

applications is available through Private PAIR only. For more information about the PAIR

system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private

PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Charles   Chow C.C.

March 24, 2005.


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